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ABSTRACT

What logic should educators use in choosing words for students to learn to spell? Common sense provides the answer: students should learn to spell the words they use in writing. What these words are has been a subject of concern since the beginning of this century. Dozens of word frequency lists have been developed over the years, based primarily on material written for and by adults. A study done at Stanford University (California) in 1966 had a great effect on spelling programs. The study concluded the vowel and consonant sounds have regular, consistent spelling about 80% of the time. A study conducted at Indiana University in 1980 and 1981 was designed to find out the words that students of the 1980s want to write as well as their spelling errors. Results indicated almost no change in the highest frequency words but that students wanted to use and spell words they have not yet encountered in reading. Special attention should be given to helping students predict spellings of words that are in their speaking but not their reading or writing vocabularies. Basic sound-letter patterns should be taught in the primary grades. To take advantage of any possible transfer of learning, spelling words should be learned following their introduction in reading. The guiding principle for the overall spelling curriculum is that children should be helped to spell those words they are most likely to need and those words they want to use in their own writing. (RS)

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WORD LIST FOR A SPELLING PROGRAM

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What logic should we use in choosing words for students to learn to spell? Common sense provides the answer: students should learn to spell the words they will use in writing. What these words are has been a subject of concern since the beginning of this century.

Vocabulary Studies: 1904-1971

By the early 1900's, the size of the basic vocabulary for a spelling program had been established as 4,000 words. The *content*, or composition, of this vocabulary-- the words to be taught--had not. The vocabulary lists of 20 then-current programs were compiled, making a total list of 80,000 words. Each program claimed to teach the 4,000 "commonest" words, the words that students and adults were most likely to write. The expectation was that all programs would be teaching the same 4,000 words. Study revealed quite the contrary; publishers disagreed on which 4,000 were most likely to be used. The combined list contained not 4,000 but 13,000 different words (Wise, 1934). Clearly, determination of what words were really used most often was imperative.

Dozens of frequency lists have been developed over the years, based primarily on material written for and by adults. Some tests were based on reading material written for students. Researchers have studied spelling errors, words and the grade levels at which they are understood, and sound-letter correspondences. The studies that have had most influence on shaping spelling vocabulary lists are:

A Basic Writing Vocabulary: The 10,000 Most Frequently Used Words (1926) by Edward Horn, based on adult correspondence.

Selection and Gradation of Words in Spelling (1934) by Carl Wise, based on analysis of existing spelling programs.

Basic Spelling: The 2,000 Commonest Words for Spelling (1942) by Edward Dolch, based on an earlier list of children's words in correspondence (Fitzgerald, 1931) and spellers.

The Teacher's Word Book of 30,000 Words (1944) by Edward Thorndike and Irving Lorge, based on adult texts, manuals, newspapers, magazines, and previous studies. The list was first published in 1921 with 10,000 words and extended to 20,000 in 1931.

A Basic Vocabulary of Elementary School Children (1945) by Henry Rinsland, based on over 100,000 samples (6 million words) of students' themes, examinations, and correspondence. The list contains 17,000 word in order of frequency.

Phoneme-Grapheme Correspondences As Cues to Spelling Improvement (1966) by Paul Hanna, Jean

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Hanna, Richard Hodges, and E. H. Rudorf, contains over 17,000 words listed by sound-letter spellings.

The American Heritage Word Frequency Book (1971) by John Carroll, Peter Davies, and Barry Richman, based on 1,000 curricular books, Grades 3-8, containing over 87,000 words.

The Living Word Vocabulary (1976) by Edgar Dale and Joseph O'Rourke, based on student comprehension of 43,000 words at given grade levels.

Basic Reading Vocabularies (1982) by Albert Harris and Milton Jacobson, based on reading programs, containing almost 10,000 words listed by grade level and frequency.

THE FREQUENCY APPROACH

Frequency lists became the guides for spelling vocabularies. Horn's analysis (1926) of 5 million words revealed that a very small number of words make up a very large percentage of writing. The following 20 words were the most frequently used, and the first 10 of them made up 25 percent of adult and student writing.

1. I	6. you	11. it	16. will
2. the	7. of	12. that	17. be
3. and	8. in	13. is	18. are
4. to	9. we	14. your	19. not
5. a	10. for	15. have	20. as

Horn's analysis also indicated that the first 1,000 words on his frequency list of 10,000 accounted for 90 percent of words written; the first 3,000, for 95 percent; and the first 4,000 for 97.8 percent. The conclusion: a satisfactory program should contain 2,800 to 3,000 well-selected words (E. Horn, 1926; Fitzgerald, 1951; T, Horn and Otto, 1954).

Horn's additional criteria for selecting vocabulary were (1) commonness of use, (2) spread in different kinds of writing, (3) crucialness of a word, (4) probable permanency of a word, and (5) the importance of a word's correct spelling to the user (Burns and Broman, 1979). Misspelling truly as "truely" may be more crucial for the speller than misspelling judgment as "judgement."

Although many students can and do learn more than 3,000 words during their elementary years (Marcus, 1977), most spelling programs today provide 3,000 to 4,000 words, thus including almost all of the words students and adults ever write.

MEMORIZING WORDS

Word frequency became the basis for teaching spelling from the thirties through the fifties (Dolch, 1942). Words were taught visually. Learning to spell each word was a separate act. There was stress on letter-by-letter spelling, syllabication, and rote memory. Frequently, the hard parts of

words were emphasized in an effort to correct anticipated misspellings in a word such as *separate*, for example. Many lists appeared to be random. Dolch provides a typical set of weekly lists from a series of the late thirties.

Third Grade	Fifth Grade	Seventh Grade
fix	hose	comment
met	soul	catalog
both	hire	jealous
says	lawn	dignity
only	niece	science
also	lying	allowing
need	whose	familiar

Dolch pointed out that the first list includes only words everyone is certain to write; the second, words somewhat less likely to be written; the third, words that will be used occasionally and by relatively few people.

THE SOUND-LETTER APPROACH

If words could be grouped by sound and spelling, researchers felt, spelling might be greatly facilitated. The Stanford University study (Hanna, Hanna, Hodges, and Rudorf, 1966) grouped words, using both consonant and vowel spelling. Their list shows these spelling for /o͞o/.

flute, rule	proof, school	route, troupe
blue, true	goose, soothe	movie, whom
chew, jewel	coupon, routine	approve, lose

The study concluded that vowel and consonant sounds have regular, consistent spelling about 80 percent of the time, that it is possible to predict spellings for almost half of the 17,000 words studied, and that an additional 37 percent can be predicted with one-error accuracy. Spelling "demons," such as *their, there, they're*, account for about 3 percent of all words. Subsequent research shows that in all cases the difficulty is in only part of the word (Henderson et al, 1972).

Consonant sounds are the most regularly spelled, vowels less so (Hanna, Hanna, and Hodges, 1971). For example, /b/ is spelled *b* or *bb* 99 percent of the time; /f/ is less regular--*f* as in *fan*, *ff* as in *stiff*, *ph* as in *photo*, and *gh* as in *enough*.

Short vowel sounds are almost always spelled with the matching alphabetic letter.

/a/ as in *pat*: 96%
/e/ as in *pet*: 90%
/I/ as in *pit* or *gym*: 91%
/o/ as in *pot*: 93%
/u/ as in *but*: 86%

Long vowel sounds are less regular, but are usually spelled with the matching alphabetic letter or the matching alphabetic letter plus a final *e*.

/ā/ as in *able, lake*: 79%
/ē/ as in *me, scene*: 72%
/ī/ as in *idea, ice*: 74%
/ō/ as in *fold, hose*: 86%
/ū/ as in *unit, dune*: 89%

The Stanford study had a great effect on spelling programs, as two third-grade word lists show. Three spellings for a single sound were included in the list that follows. High-frequency words that did not fit the pattern taught at the grade level were listed separately (Williams et al, 1972).

Spelling /ī/				
cry	tie	slide	strike	*Memory Words*
fry	pie	kite	wide	mother
sky	lie	bike	beside	brother
spy	die	bite	quite	her
		hide	hike	

Another third-grade list provides two sounds, /ū/ and /u/, and one spelling. Again, a common word (truth) that does not fit the pattern is listed separately.

Cool Wool Words				
boot	cook	noon	stood	shoot
brook	pool	wool	roof	shook
tooth	crook	broom	hook	cool
				--truth

Vocabulary from Student Compositions

Until 1982, the Rinsland study, published in 1945, was the only major national study that was based on students' compositions and that produced a frequency list. The frequently-used Dolch list was based on words listed from textbooks and checked against earlier word lists from children's letters and school papers (Dolch, 1942). Other studies providing vocabulary for spelling programs were based on material written for and by adults and on reading material for students or on word tests taken by students. The Indianan University study of 1980-1981 was designed to find out the words that students of the 1980's want to write as well as their spelling errors (Smith and Ingersoll, 1982).

Participating students (Grades 1-8) represented all types of populations--rural, urban and suburban. They wrote compositions on subjects of their choice or in response to teacher suggestions without consulting dictionaries. Approximately 15,500 compositions, 2,000 per grade, were received.

They produced 484,487 running words, 10,262 different words, and more than 10,000 spelling errors.

The study revealed a changing vocabulary. Among the first 5,000 words in the study, 1,758 were different from the Rinsland list of 1945, and 1,915 were different from the 1926 Horn list.

HIGH-FREQUENCY WORDS

Analysis indicated that there has been almost no change in the highest-frequency words. The 10 most frequently used words accounted for 28 percent of all the words written. (Horn's first 10 made up 25 percent.) Words identified by Smith and Ingersoll that appeared in the first 10 words in the Horn list are followed by an asterisk (*).

1. a*
2. the*
3. and*
4. I*
5. to
6. was
7. my
8. of*
9. we*
10. he

The 100 most frequently used words accounted for approximately 60 percent of all words used. They are substantially the same as the first 100 words found in earlier frequency lists.

100 Most Frequently Used Words by Children Grades 1-8

1. a
2. the
3. and
4. I
5. to
6. was
7. my
8. of
9. we
10. he
11. it
12. they
13. would
14. is
15. in
16. have
17. that
18. for
19. you
20. she
21. be
22. on
23. but
24. when
25. me
26. like
27. then
28. were
29. all
30. go
31. get
32. there
33. with
34. had
35. are
36. so
37. went
38. up
39. at
40. said
41. them
42. if
43. her
44. one
45. because
46. do
47. school
48. got
49. his
50. about
51. day
52. out
53. him
54. will
55. not
56. people
57. make
58. could
59. or
60. can
61. very
62. play
63. some
64. what
65. this
66. time
67. home
68. good
69. as
70. down
71. their
72. house
73. back
74. came
75. from
76. friends
77. too
78. other
79. after
80. don't
81. our
82. no
83. just
84. has
85. lot
86. fun
87. things
88. by
89. little
90. know
91. want
92. saw
93. did
94. more
95. see
96. big
97. us
98. your
99. every
100. didn't

The 500 most frequently used words in the study comprised 81 percent of all words written. However, approximately half (5,081) of the total number of words used by children in the study had a frequency of only 1 or 2; that is, each of these words appeared only once or twice in the entire survey. Roughly 50 percent of the words provided a total contribution of only 1.4 percent of all words written. This indicates considerable divergence in students' choice of words and underscores the importance of utilizing current vocabulary as the basis for a spelling program.

Source: *Written Vocabulary of Elementary School Pupils, Ages 6-14*, C. Smith and G. Ingersoll, 1982.

VOCABULARY TRENDS

Comparison of vocabulary (the Smith and Ingersoll study and earlier lists) indicated shortening of some words, replacements for others, and some altogether new words. *Advertisement* is now *ad*, for example, and *examination* is *exam*. *Crude* has been replaced by *gross* in common student usage and *trousers* by *jeans*. Some altogether new words have appeared, as they continue to do so.

all-star	four-seater	rerun
blast-off	minibike	ten-speed
cookout	nuclear	
disco	pollution	

Unexpectedly difficult and sophisticated words were used (often misspelled) by students in the early grades.

Grade 1	Grade 2	Grade 3	Grade 4
helicopter	evaporate	miniature	maneuvered
hospital	elephants	dinosaur	disintegrate
rescue	festival	government	instructor
ruin	medicine	gymnast	laser
surprised	pirate	lizard	nonprofit
survive	president	thermostat	orphanage
tyrannosaurus	trampoline	environment	overpopulating

Some of these words do not appear at all in current reading-vocabulary lists (Harris and Jacobson, 1982); some appear, but at later grade levels than those of the student writers. Not listed at all for Grades 1-8 in the Harris-Jacobson study are *overpopulating*, *nonprofit*, and *disintegrate*. *Helicopter*, used by a first-grader, is a Grade 3 word. *Evaporate*, *miniature*, and *maneuver* are all Grade 6 words. Thus, the study indicates, because students want to use and spell words they have not yet encountered in reading, **special attention should be given to helping them predict spellings of words that are in their speaking but not their reading or writing vocabularies**.

Grouping of Spelling Words

Most spelling vocabularies consist of approximately 4,000 most frequently used words that comprise 97.8 percent of the words students will ever write (Horn and Otto, 1954). The first 1,000 of these words have remained stable over the decades (Hollingsworth, 1965); however, recent research has indicated that while these words continue to be of highest frequency, new words are entering students' written vocabularies and should be provided for (Smith and Ingersoll, 1982).

ANALYSIS OF SPELLING ERRORS

The Indiana study reported almost 10,500 spelling errors. An analysis of these errors provides guidance for both grouping and distribution of words. Errors reported were of five general types: (1) incorrect use of sound-letter spellings, (2) unawareness of word families, (3) misuse, or confusion, of homophones, (4) errors in compounding words, and (5) unawareness of word structure or non-application of spelling rules. This excerpt from a 226-word seventh-grade fantasy provides examples of several types of spelling errors; the underlined words were the only errors in the narrative:

> "I hope you're not going to eat me," said a little worm. Willamena (a bird) was so suprised she jumped. Then the little worm said, "Hey, watch where your going." Willamena stoped and said, "I'm sorry, but you suprised me." "Well, suprising is a lot better than getting eaten," said the little worm. "My name is Willfred, but call me Willy for short."

Another composition contains a variety of error types.

> I don't want to be a nurse becaus you have to give shots. I don't want to be a vetenarian because it's hard to be a vet. I don't want to be a fotografer becaus you have to work to late. And I don't want to be a police woman because I'm afraid of guns.

GROUPING BY SOUND-LETTER SPELLINGS

Research has found that students rely on sound-letter strategies 85 percent of the time when spelling unfamiliar words (Read, 1971; Hammond, 1971). The Indiana study reinforces these findings: "ether" and eather" for *either*, "hert" for *hurt*, "techer" for *teacher*, and "sience" for *science* were examples. A first-grade example, corrected for punctuation only, shows a young child's reliance on auditory perception and the names of letters of the alphabet for spelling words of which the writer was not sure. (Smith and Ingersoll, 1982).

> The cookies floow out of the uvin and then tha floow in the gras. Then tha gut up. Then tha went into another howse. Then a girl cam to the dor. Then sey sed "Hlow, cookies. Cum in, cookies."

The regularity and predictability of English spellings was demonstrated by the Stanford study of sound-letter patterns (Hanna, Hodges, Hanna, and Rudorf, 1966). The findings have had ample research support (Chomsky and Halle, 1968; Venezky, 1967; Venezky and Weir, 1966). Grouping by patterns, therefore, has important implications for spelling programs.

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PRESENTATION OF CONCEPTS. Providing patterns in a list containing two spellings for /ē/ spelled *ea* as in *cream, treat*, and *peace* and spelled ee as in *fleet, tree*, and *seem* enables students to arrive at a generalization that will enable them to predict spellings for the same sound in unfamiliar words. The learning is perceived as useful; students are involved and motivated as they learn to make their own correct predictions.

A SPIRAL PROGRAM. Grouping words by sound-letter patterns permits sequencing across the grades, with an increasing number of patterns for each sound (Beers and Henderson, 1977; Hanna, Hodges, and Hanna, 1971; Read, 1971; Personke, 1966; Glim, 1965; Clymer, 1963). With this arrangement of words, introduced in order of their frequency, students come to *think* like good spellers, considering the spelling patterns used for the sounds they hear in unfamiliar words.

Spiraling by means of the sound-spelling approach is typified by the following listings for /ô/.

- Grade 2: d<u>o</u>g
- Grade 3: <u>o</u>ff, ch<u>a</u>lk, cr<u>a</u>wl
- Grade 4: l<u>o</u>ss, b<u>a</u>ll, f<u>a</u>wn, h<u>au</u>nt, f<u>ough</u>t, d<u>augh</u>ter
- Grade 5: cl<u>o</u>th, w<u>a</u>ltz
- Grade 6: m<u>o</u>ss, w<u>a</u>lnut

Not all of the words in a curriculum word list can be grouped by sound-letter patterns; those that are selected should have many applications and few exceptions, and the rule should positively affect spelling ability (Marcus, 1977).

SEMANTIC FAMILIES

Errors like "explaination" and "medesin" by a student who correctly spelled *explained* and *medic* indicate the need for grouping of spelling words by their relationship. Understanding the relationship of words groups like *explain/explanation/explanatory, medic/medicine/medicinal/medication*, and *provide/provident/providence* is preferable to a sound-letter approach for such words, where pronunciation often changes and spelling may or may not.

WORDS OFTEN CONFUSED

Incorrect choice, of the word, not misspelling, was usually the error among words often confused. This points up the importance of grouping such words and using them in context. The problem persisted over all grades. The misuse of *to, two*, and *too* began in Grade 1 and continued, cropping up occasionally in Grade 8. Spelling was often inconsistent -- *your birthday* and *you're house* in one paragraph. Other difficult groups included *no/know, buy/by, here/hear, fair/fare, knew/new, or/ore, passed/past, tale/tail, their/there/they're*. This third-grade example contains both

sound-letter misspellings and confusion of words that sound alike.

> A dinasar came out of the north woods and attact Paul Bunyan. Paul reeched in its mouth and got its tale. He pulled hard and put the inside on the outside. That is why the dinasar looks so bony in the miseum.

COMPOUND WORDS

Writing compound words as single words or single words as compounds was a frequent source of error. *Everybody, anything, everywhere, outside, homework,* and *whatever* were troublesome. *All right* often appeared as "alright" and *a lot* as "alot." A fragment from a long and interesting seventh-grade narrative contains both confusion of words and compound-word errors.

> Paul kept saying "Retardo, retardo," and pushing Roger around. This went on four about two months, and Roger still didn't have a friend and every one made fun of him. He came home crying everyday.

WORD STRUCTURE AND SPELLING RULES

Failing to change *y* to *i* when adding an ending, to drop a final e when adding an ending beginning with a vowel, or to double a final consonant when adding an ending all proved to be problems at all levels.

- GRADE 3: At the begining of the ground there was onion grass. We ate some.

- GRADE 4: They started sleding and having fun . . . and they lived happyly ever after.

- GRADE 6: Paul grew unhappy on Planet Zuki and planed to escape.

The only spelling error in a long and complicated eighth-grade story that included and correctly spelled *operation, examination,* and *straight* was "daisys."

Distribution of Vocabulary

Horn suggested (1926): "The most important words should be introduced in the beginning grades, and those of lesser importance in the later grades; the simplest words should be introduced in the beginning grades; and words needed in the curriculum activities should be introduced when appropriate" (Burn and Broman, 1979).

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The 20 highest-frequency words that make up 25 to 28 percent of student and adult writing (Horn, 1926; Smith and Ingersoll, 1982) are needed in the primary years, must be taught separately, and learned visually. These words should be introduced in the first grade: *I, the, and, to, you, we, he, for, it, that, is, are, not*. Second-grade children should review those words and in addition master *in, have, my*, and *be*.

Basic sound-letter patterns should be taught in the primary grades. To take advantage of any possible transfer of learning, spelling words should be learned following their introduction in reading.

The guiding principle for the overall spelling curriculum is that children should be helped to spell those words they are most likely to need and those words they want to use in their own writing.